T&E AGENDA: 06-01-09
ITEM: 3.1 (c)

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: TRANSPORTATION & ENVIRONMENT COMMITTEE

FROM: James R. Helmer
Katy Allen

SUBJECT: SAN JOSÉ PUBLIC STREETLIGHT CONVERSION UPDATE

DATE: May 15, 2009

Approved

Date 5/20/09

RECOMMENDATION

Accept this report on the status of implementation of the Public Streetlighting Policy adopted by City Council in December, 2008.

OUTCOME

Acceptance of this report will support staff's efforts to: 1) continue to develop a Lighting Master Plan that will enable the City to implement the new Public Streetlighting Policy; 2) evaluate new products and develop specifications for "smart" LED streetlights that takes advantage of emerging technologies to provide effective street and pedestrian scale lighting that minimizes operating and maintenance costs; and 3) identify potential funding options to convert more of the City's streetlights from sodium vapor to LED.

BACKGROUND

On December 16, 2008, the City Council adopted Resolution No. 74739 approving a new Public Streetlighting Policy. The new policy was drafted to help the City of San José advance several of its *Green Vision* goals, particularly replacing 100 percent of the City's streetlights with smart, zero emission streetlights (lights powered exclusively by renewable energy) by 2022. A key element of the new policy is the development and approval of a Lighting Master Plan, which will address a variety of issues including lighting curfews (dimming lights) and the viability of instituting a cap on streetlight electrical energy consumption. Staff was also directed to work with PG&E and other interested parties to consider shifting the City's streetlights to a metered electrical rate schedule, based on actual usage. Staff proposed returning to the Committee in six months for a progress update.

On April 6, 2009, staff presented two reports to the Transportation and Environment Committee regarding potential energy savings resulting from shutting off streetlights and an update on Public Works Standard Plans and Specifications. Light Emitting Diode (LED) technology

factored highly in the discussions of both items. Staff was directed to return to Committee with an analysis of potential energy savings and funding mechanisms to help speed the deployment of this new technology. A thorough response to these questions will be provided to the Committee in November, along with the draft Lighting Master Plan.

ANALYSIS

LED lighting technology is not new. The City of San José began deploying LED traffic signal lights about 15 years ago. However, high-power LED applications for streetlights are relatively new and have resulted from recent rapid advances in the quality and power of these lights. There is a rapidly increasing body of research indicating that LED lighting for streetlights is superior in a variety of aspects to traditional lighting.

Unlike sodium vapor lamps (high and low pressure sodium) – which produce a yellow light – LEDs produce a white light. A growing number of studies are concluding that the light produced by LEDs is perceived as brighter than yellow light and improves visual performance in low-light settings. Traditional roadway lighting standards are designed based on "photopic" vision, which is the ability of the human eye to see in daylight conditions. However, studies are showing that the human eye operates differently in low-lighting or "mesopic" conditions, such as driving at night. Studies in the U.S. and abroad indicate that lower levels of white light may be equally or more effective for nighttime vision than higher levels of yellow (sodium-vapor) light.

LED lights also have the benefit of being more directional than traditional lighting sources. This allows lighting designers to better control the focus of the light and to put more light where it is needed, on streets and sidewalks rather than in living rooms or the night sky. These benefits all come at a savings in energy costs.

San Jose's streetlighting design policy, which is set forth in Resolution No. 63396, was developed long before the use of LEDs for streetlighting. Resolution No. 63396, which the City Council adopted in 1991, requires streetlighting in new developments to meet or exceed the standards of the "American Standard of Practice for Roadway Lighting" as published by the Illuminating Engineering Society of North America (IESNA), reprinted in 1964. Although the Resolution applies only to new developments, the City's practice has been to apply its standards to City capital projects. The design guide has not been applied to maintenance, repair, or retrofit of streetlights. There is a growing consensus among lighting experts that traditional streetlighting design guidelines – such as those reflected in the San Jose's policy - should be changed to reflect the benefits of LED technology. Staff believes that doing so would enable San Jose to improve the quality of lights on its streets and reduce light pollution while saving energy. Staff is evaluating new industry standards as they are being developed to utilize the best available guidelines for the design of new streetlight systems.

The Public Streetlighting Policy directed staff to pursue streetlighting alternatives that will decrease energy consumption, and use energy efficient, dimmable, and programmable streetlights that are constructed with minimal hazardous materials. Pursuant to this direction, staff is in the process of transitioning to more widespread use of LEDs. This process includes a

number of different actions aimed at developing appropriate design standards for the use of LEDs in streetlights.

To better understand the state of the industry, develop performance specifications that will distinguish good products from bad, and develop a Lighting Master Plan, staff is coordinating with a variety of technology experts, product developers, PG&E, Lick Observatory, the California Energy Commission and the U.S. Department of Energy (DOE). DOT has also convened an inter-departmental Lighting Master Plan committee to gain the perspective and tap the expertise of City staff on these issues.

In addition, DOT, Public Works and Redevelopment Agency staffs are evaluating a number of LED streetlight products in a variety of applications throughout San Jose. The City has three streetlight installations currently underway. These projects will generate valuable information about the current capabilities, benefits and limitations of LED streetlights and advanced control and communications systems. San José is pairing its LED streetlights with control systems to enable the City to vary streetlighting levels over the course of the night. This will increase the City's energy savings and protect Lick Observatory's ability to conduct astronomical research. The street and pedestrian streetlight installations will provide the City with quantitative data on LED lighting characteristics such as distribution and intensity as well as qualitative information on color, glare and public perception. They will also enable the City to meaningfully engage the public and key stakeholders in development of the Lighting Master Plan.

The three LED conversion projects now underway are:

1. Green Vision Project – LED Streetlights Conversion

The 2008-2009 Community Development Block Grant Program (CDBG) provided $150,000 for the Green Vision Project —converting low-pressure sodium streetlights to programmable LED streetlights. The project is located in the area bounded by Story Road, Leeward Drive, Ocala Avenue and Adrian Way. (The CDBG grant also included $275,000 to plant 500 street trees in the same neighborhood). The purchase order contract was awarded to Echelon Corporation through a competitive process to procure 125 LED streetlights with programmable communication systems. The project is scheduled for completion by July 2009.

2. North San José Streetlight Conversion to LED

The San José Redevelopment Agency is spending $200,000 to fund a project to convert approximately 150 low pressure sodium streetlights to programmable LED streetlights in North San José. The project area is Tasman Drive between 1st Street and Cisco Way and Orchard Parkway between Trimble Road and Charcot Avenue. The project is scheduled for completion in fall 2009.

3. 24th Street Streetscape Improvements

The San José Redevelopment Agency is also funding the installation of 40 LED pedestrian lights on 24th Street between Santa Clara and Williams streets. The project will include up to four luminaries by different manufacturers to test fixtures as well as the color (cool to warm white), intensity and distribution of the light. The project is scheduled for completion by the end of November.

The City is considering LED lights for a number of new City capital projects in addition to the 24th Street project.

Technological Advances:

San José is clearly on the leading edge of this technological wave. But it is not alone in pressing for these advancements.

PG&E is interested in collaborating with San José on a field study of the City's streetlight conversions. The utility has hired lighting design consultants, including the California Lighting Technology Center at UC-Davis, to assist them in this study. The study will investigate the viability and potential benefits of LED products and network control systems, including the efficacy of replacing yellow sodium-vapor lights with white LEDs. The results of the study will advance our understanding and efforts in areas such as lighting quality, dimming, electrical metering, status monitoring and failure detention, maintenance and energy savings. The results will be published by DOE.

PG&E is also supportive of the City's efforts to develop a cost-effective means of metering its streetlights. The technology currently exists to meter streetlights at the level of precision required by PG&E and the California Public Utility Commission (CPUC). However, control system vendors have not integrated this functionality into their products. In addition to the technical hurdles that they would need to overcome, vendors must be convinced that there is a business case for making the required investment. The evidence in favor of that investment is mounting. In addition to San Jose's expressions of interest, the California Energy Commission has signaled its desire to see lighting controls integrated into all exterior lights. Congresswoman Jane Harman has also introduced a bill that would require all outdoor lighting to be dimmable. Once the economic and technical challenges are overcome to the satisfaction of all involved, the City will be able to switch from its current non-metered rate to one of PG&E existing metered rates.

By this fall, DOE anticipates it will begin certifying LED streetlights for its Energy Star program. The Energy Star rating, the most recognizable symbol of energy-efficient products in the United States, is likely to figure prominently in the City's LED streetlight specifications.

Funding Opportunities:

<u>ARRA – Energy Efficiency and Conservation Block Grant</u>

On February 17, 2009, President Barack Obama signed the American Recovery and Reinvestment Act (ARRA) to stimulate the faltering economy and to create or save 3.5 million jobs over the next two years. The City is proposing to invest $2 million of an estimated $8.8 million it will receive in Energy Efficiency and Conservation Block formula grants to replace approximately 1,500 low pressure sodium streetlights with programmable LED lights. Staff is investigating the possibility of securing additional ARRA funding, including EECBG competitive funds at the state and federal level, for additional conversion projects.

Other potential funding sources

In response to a request by the Committee at its April T&E Committee meeting, staff is researching the potential of using bonds to more rapidly convert more of the City's streetlights. The next two installations, and the development of adaptive lighting guidelines, will provide staff with valuable data to include in that analysis. Staff will report back on its findings at the November T&E Committee meeting.

New Rates and Rebates:

On May 1, Pacific Gas & Electric (PG&E) implemented its new streetlight tariff, which includes rates for LEDs. The new rates will allow San José to switch to a lower billing rate for installing or replacing streetlights utilizing LED technology. PG&E is also offering rebates to jurisdictions that purchase qualifying LED replacement lights installed after May 1. The rebates will range from $50-$125 for lamps up to 200 watts.

Next Steps

During the next six months, staff intends to continue to:

- Meet with technology experts, PG&E, Lick Observatory, and product manufacturers to develop clear and measurable performance specifications for the City's streetlights and control systems;
- Meet with experts such as those noted above as well as the Lighting Master Plan Committee to draft adaptive lighting guidelines and streetlight energy cap program for the City;
- In keeping with the City's "Community Engagement Process," engage the public and key stakeholders in developing the above mentioned policies for Council's consideration;
- Work with other jurisdictions and interested parties to urge vendors to develop the technological capabilities San José and other local governments seek;
- Work with PG&E and the PUC to ensure that San José is able to transition as quickly as possible to metering its streetlights.

A draft Lighting Master Plan will be presented to the Transportation and Environment Committee for consideration in November 2009 along with a report on financing options for converting additional public streetlights; energy savings achieved to date, and the status of metering technology.

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